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IS 15521 (2004): Graphic technology - Determination of tack of paste inks and vehicles by a rotary tackmeter [CHD 14: Printing, Inks, Stationary and Allied Products]



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“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक

ग्राफिक प्रौद्योगिकी — घूर्णी टेकमीटर द्वारा पेस्ट स्याही
और माध्यम का टेक ज्ञात करना

Indian Standard

**GRAPHIC TECHNOLOGY — DETERMINATION
OF TACK OF PASTE INKS AND VEHICLES
BY A ROTARY TACKMETER**

ICS 87.080

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

NATIONAL FOREWORD

This Indian Standard which is identical with ISO 12634 : 1996 'Graphic technology — Determination of tack of paste inks and vehicles by a rotary tackmeter' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendations of the Printing Inks, Stationery and Allied Products Sectional Committee and approval of the Chemical Division Council.

The text of this ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Some terminology and certain conventions are however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.
- b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

For tropical countries like India, the standard temperature and the relative humidity shall be taken as $27 \pm 2^{\circ}\text{C}$ and 65 ± 5 percent respectively.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounding off value should be the same as that of the specified value in this standard.

Introduction

The tack value is a well-established criterion for assessing a paste ink or vehicle, although the parameter tack is poorly defined. The tack cannot be regarded as a material property that can be derived from basic physical phenomena. However, the tack may predict in some cases the behaviour of ink in a printing press.

Parameters that affect tack are:

- dimensions, hardness and elasticity parameters of elastomeric rollers;
- surface properties of rollers;
- nip pressure;
- roller speed;
- the temperature of rollers and environment;
- the temperature of the sample;
- the ink film thickness;
- influence of the ink or vehicle on the properties of the elastomeric rollers (e.g. absorption of solvents);
- the condition of the elastomeric rollers due to the cleaning process;
- the condition of the elastomeric rollers due to long-term use;
- the properties of the test sample.

Respecting all differences, this International Standard is a guideline so that users of comparable equipment obtain comparable results when working under the same conditions. This International Standard cannot replace the technical manuals.

Indian Standard

**GRAPHIC TECHNOLOGY — DETERMINATION
OF TACK OF PASTE INKS AND VEHICLES
BY A ROTARY TACKMETER**

1 Scope

This International Standard specifies the procedure for determining the tack value of paste inks and vehicles which have low volatility and are unreactive under normal room conditions during the time span required for testing.

This International Standard contains a basic description of the rotary tackmeters most commonly used.

2 Definition

For the purposes of this International Standard, the following definition applies.

2.1 tack: Restoring force between two rotating rollers of a given width caused by the splitting of an ink or vehicle film on the roller surfaces.

NOTES

- 1 Tack is a rheological parameter indicative of internal cohesion and other physical/chemical properties of the fluid.
- 2 The term "apparent tack" is deprecated because all tack values are instrument specific by nature.

3 Test method

3.1 Principle

A rotary tackmeter consists of a roller system of at least 3 rollers. One roller is driven by a motor while another is connected to a sensor measuring the force at which the roller is displaced from its equilibrium position. The third is an oscillating roller used for sample distribution. Measurement of the restoring force induced by the splitting of the ink or vehicle film provides an instrument-specific value of tack.

3.2 Apparatus

The apparatus used for the test shall include:

- rotary tackmeter; ¹⁾

¹⁾ The following are examples of suitable tackmeters available commercially (in alphabetical order):

- Betta Tech 2000;
- Prüfbau Inkomat;
- Prüfbau Tackomat;
- Tack-o-scope;
- Thwing-Albert Inkometer;
- Toyoseiki Inkograph.

This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of this (these) product(s).

- ink pipette suitable for measuring the sample volume with an accuracy of $\pm 1\%$;
- thermostat to control the roller temperature to $\pm 0,2\text{ }^{\circ}\text{C}$;
- stopwatch or timer;
- washing agent; the washing agent shall not change the conditioning of the elastomeric rollers;
- calibratory equipment;
- x/t recorder, optional.

3.3 Temperature

The test shall be carried out under a room temperature of $(23 \pm 2)\text{ }^{\circ}\text{C}$.

The test shall be performed at constant instrument temperature. Widely used thermostat settings are $30\text{ }^{\circ}\text{C}$ or $32\text{ }^{\circ}\text{C}$.

3.4 Conditioning of the tackmeter

After installation or when new rollers are installed, the elastomeric rollers need to be stabilized before use by repeated runs with material of the type to be tested. These runs shall be repeated until tests of a reference ink or vehicle show consistent results.

In normal use with properly stabilized rollers the tackmeter shall be conditioned by a preliminary run using ink or vehicle of the same type to be tested.

If the ink or vehicle to be tested affects the roller material (e.g. radiation curable inks) separate sets of dedicated rollers shall be used.

3.5 Calibration

Before regular use, the tackmeter shall be calibrated according to the manufacturer's instructions. Additionally, a routine test is recommended using an internal standard ink or vehicle with known performance.

3.6 Preparation for testing

The sample shall be homogenous and it shall not contain any coarse particles.

3.7 Test procedure

A measured amount of ink or vehicle shall be evenly distributed on the tackmeter rollers using an ink pipette. The amount of ink or vehicle to be applied should be in accordance with the manufacturer's recommendations.

NOTE — These amounts result in an optimum ink film thickness for the respective instruments. The following amounts are recommended by the manufacturers, they yield an ink film thickness from $4\text{ }\mu\text{m}$ to $13\text{ }\mu\text{m}$.

Tackmeter	ml
Betta Tech 2000	1,00
Prüfbau Inkomat	1,00
Prüfbau Tackomat	0,55
Tack-o-scope	0,30
Thwing-Albert Inkometer	1,32
Toyoseiki Inkograph	1,31

The test sample shall be distributed at low speed for 30 s.

After having switched to measuring speed, a first tack reading shall be taken as soon as the roller speed is stable. A second reading shall be taken after one minute of running.

3.8 Cleaning

After testing, the roller system and the pipette shall be cleaned immediately with appropriate cleaning agents.

NOTE — The ink or vehicle is removed from the roller surface by a solvent-dampened wiper folded tightly and held tightly against the driven roller or roller nip while running the tackmeter at low speed. When cleaning high tack inks or vehicles from the rollers it is recommended to dispense a small amount of solvent onto the rollers beforehand. This procedure may be repeated if necessary to remove most of the material. The machine is stopped and then wiped gently to remove ink or vehicle and excess solvent from all rollers.

The instrument shall be run at low speed for at least three minutes before another sample is tested.

4 Report

The test report shall include the following information:

- Sample designation;
- Tack data;
- Room temperature;
- Thermostat temperature;
- Type of tackmeter;
- Amount of ink or vehicle used and/or film thickness;
- Roller surface speed in metres per minute or revolutions per minute;
- Period for sample distribution (if not 30 s);
- Periods at which readings are taken;
- Report of non-standard test conditions;
- Date of testing;
- Operator.

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110 002

Telephones : 2323 0131, 2323 3375, 2323 9402 Website : www.bis.org.in

Regional Offices :

Telephones

Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110 002	{ 2323 7617 2323 3841
Eastern	: 1/14 C. I. T. Scheme VII M, V. I. P. Road, Kankurgachi KOLKATA 700 054	{ 2337 8499, 2337 8561 2337 8626, 2337 9120
Northern	: SCO 335-336, Sector 34-A, CHANDIGARH 160 022	{ 260 3843 260 9285
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